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Short Report

Revascularisation of Internal Carotid Artery Aneurysm near the Skull Base

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ABSTRACT

A 51-year-old man presented with a pulsatile neck mass. Computed tomography angiography (CTA) revealed a right internal carotid aneurysm. No neurological symptoms occurred for more than 40 years in this patient, which indicated a possible congenital lesion worsened by secondary atherosclerosis. The aneurysm extended from the carotid bifurcation nearly to the base of the skull, and a normal internal carotid artery (ICA) segment was found before entering the carotid canal. The distal end of the extracranial ICA was exposed by transecting the digastric muscle and removing the styloid process during the procedures. The external carotid artery (ECA) was chosen as the inflow source in order to shorten the clamping time of the ICA. His recovery was uneventful, and the follow-up at 2 years revealed that carotid artery patency was obtained.

Case

A 51-year-old man was referred for a 40-year history of a pulsatile mass in the right side of the neck. The mass enlarged progressively without neurological symptoms. However, headache and dizziness developed 4 years before admission. A computed tomography angiography (CTA) demonstrated a right internal carotid aneurysm, which ranged from the carotid bifurcation (Fig. 1(a)) nearly to the skull base.

The operative procedures were carried out to preclude the development of the neurological symptoms. The cutaneous incision was made with two curves from the preauricular region down to the neck along the anterior border of the sternocleidomastoid muscle. The carotid bifurcation and the proximal part of the internal carotid artery (ICA) were identified by the usual methods. After the removal of the styloid process, the digastric muscle was transected and the distal ICA at the base of the skull was exposed. The vagus, accessory and hypoglossal nerves were all identified and preserved.

After systemic heparinisation, the aneurysm was dissected free. The external carotid artery (ECA) was resected (2 cm distal to the bifurcation) and an inverted great saphenous vein (GSV) graft was anastomosed to the proximal stump of the ECA without clamping the ICA or the common carotid artery (CCA). Then, the other end of the graft was sewn to the distal end of the ICA near the skull base when the distal end of the ICA was controlled by clamping and the aneurysm was opened (Fig. 2). Thus, the clamping time was limited to 10 min and potential cerebral ischaemia time was shortened. Restoration of the blood flow was successful. Postoperative recovery was uneventful, and the follow-up at 2 years revealed that ICA patency was obtained (Fig. 1(b)).

Discussions

The aneurysms of the ICA involving the distal end at the skull base are rare lesions.[1] As described by Rosset,[2] the extracranial ICA can be divided into three segments. The third segment corresponds to the part in the infratemporal fossa before entering the base of the skull. The surgical approach to this part often results in injury of the neighbour cranial nerves because of the complex anatomy of this region.[3]

It is reported that ECA transposition can be used for ICA aneurysm repair, suggesting the feasibility of the ECA as the inflow source.[4] There are disadvantages of the ECA as the inflow; for example, the smaller size of the ECA than the CCA causes the anastomosis to be prone to stenosis. The ECA stump in our case was a medium-size one. Hence, the ECA was chosen as the inflow conduit in our case to reduce the ischaemia time. The blood supply to brain was blocked only when sewing the distal stump and the ischaemia time of brain caused by clamping was shortened to 10 min.

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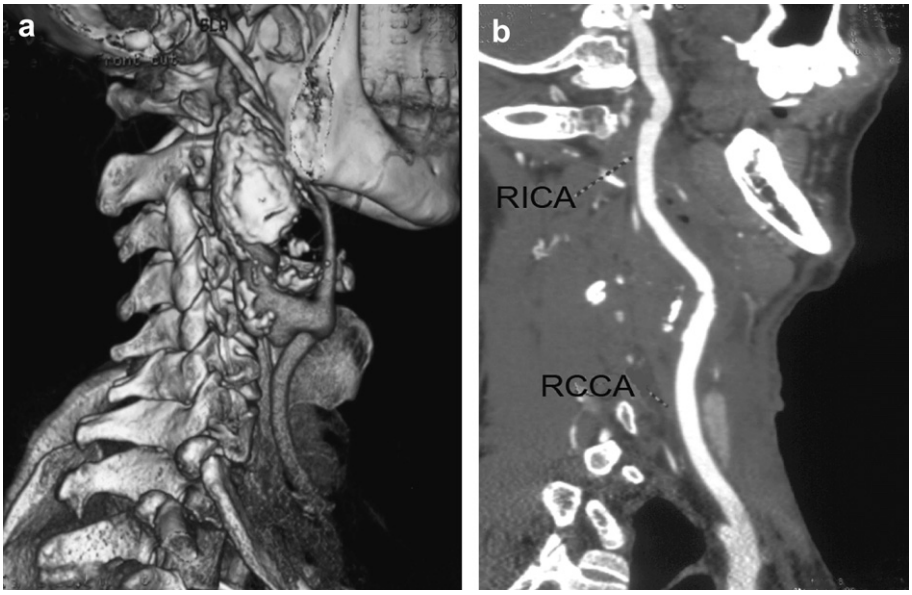

Figure 1. (a) Preoperative image. A right internal carotid aneurysm (3.0 × 3.7 × 7.1 cm) ranged from the carotid bifurcation nearly to the skull base can be seen. A normal segment can be found before entering the carotid canal. (b) Postoperative image–2 years after operation. The graft was patent. No neurological events happened.

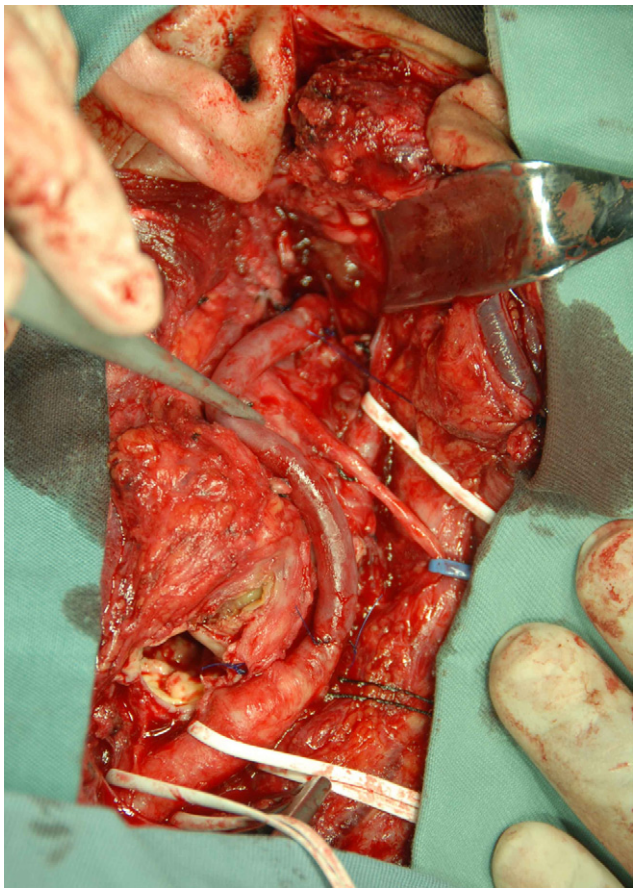

Figure 2. Intraoperative image. The proximal end of the graft was sewn to the ECA firstly and the distal end was sewn to the ICA.

Conflict of Interest/Funding

None.

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